REMARKS

The specification and claims in the present application have been amended. No new matter has been added. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 505-5100. For payment of the fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-2587 (Order No. SJO9-2001-0068US2/HIT1P020A). A duplicate copy of the transmittal is enclosed for this purpose.

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Appendix A

PLANAR GAP PRE-FILL METHOD FOR READ HEADS [PLANAR GAP PRE-FILL SYSTEM AND METHOD FOR READ HEADS]

Appendix B

The present application is a divisional of U.S. application serial number 09/875,405 which was filed on June 5, 2001, which is incorporated herein by reference in its entirety.

Appendix C

1. (Cancelled) A magnetoresistive (MR) read head comprising:

a shield layer with a recessed portion and a protruding portion defined by the recessed portion;

an MR sensor located in vertical alignment with the protruding portion of the shield layer;

at least one gap layer situated above the MR sensor; and

at least one gap layer situated below the MR sensor;

wherein at least one of the gap layers is positioned in the recessed portion of the shield layer.

2. (Cancelled) The MR read head as recited in claim 1, wherein the gap layers include a first gap layer located on top of the recessed portion of the shield layer.

3. (Cancelled) The MR read head as recited in claim 2, wherein the first gap layer includes an upper surface substantially level with an upper surface of the protruding portion of the shield layer.

4. (Cancelled) The MR read head as recited in claim 2, wherein the gap layers include a second gap layer located on top of the first gap layer and the protruding portion of the shield layer, the MR sensor being located on top of the second gap layer.

5. (Cancelled) The MR read head as recited in claim 4, wherein an upper surface of the second gap layer is planar.

6. (Cancelled) The MR read head as recited in claim 4, wherein the gap layers include a third gap layer located on top of the MR sensor.

7. (Cancelled) The MR read head as recited in claim 6, wherein a combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion of the shield layer.

8. (Cancelled) The MR read head as recited in claim 1, wherein the recessed portion of the shield layer is formed by an etching process.

9. A method for fabricating a magnetoresistive (MR) read head comprising:
depositing a shield layer;

etching a recessed portion in an upper surface of the shield layer, the recessed portion of the shield layer defining a protruding portion of the shield layer;

depositing a first gap layer on top of the recessed portion of the shield layer;

depositing a second gap layer on top of the first gap layer and the protruding portion of the shield layer;

positioning an MR sensor on top of the second gap layer in vertical alignment with the protruding portion of the shield layer;

positioning first and second lead layers on top of the second gap layer, the first and second lead layers being connected to the MR sensor; and

depositing a third gap layer on top of the second gap layer, the MR sensor, and the first and second lead layers.

10. The method as recited in claim 9, wherein the first gap layer includes an upper surface substantially level with an upper surface of the protruding portion of the shield layer.

11. The method as recited in claim 9, wherein an upper surface of the second gap layer is planar.

12. The method as recited in claim 9, wherein a combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion of the shield layer.

13. The method as recited in claim 9, wherein the recessed portion of the shield layer is etched utilizing ion milling.

14. The method as recited in claim 9, wherein the recessed portion of the shield layer is etched utilizing reactive ion etching.

15. The method as recited in claim 9, wherein the recessed portion of the shield layer is etched utilizing wet etching.

16. (Cancelled) A magnetoresistive (MR) read head comprising:

a shield layer;

a bottom gap layer located on top of the shield layer, the bottom gap layer including an upper surface that is planar;

an MR sensor located on top of the bottom gap layer; and

a top gap layer located on top of the bottom gap layer and the MR sensor;

wherein a combined thickness of the bottom gap layer and the top gap layer is thinner adjacent to the MR sensor than a location distant therefrom.

17. (Cancelled) A magnetoresistive (MR) read head comprising:

a shield layer with a recessed portion and a protruding portion defined by the recessed portion, the recessed portion of the shield layer being formed by an etching process;

a first gap layer located on top of the recessed portion of the shield layer, the first gap layer including an upper surface substantially level with an upper surface of the protruding portion of the shield layer;

a second gap layer located on top of the first gap layer and the protruding portion of the shield layer, an upper surface of the second gap layer being planar;

an MR sensor located on top of the second gap layer in vertical alignment with the protruding portion of the shield layer;

first and second lead layers located on top of the second gap layer and connected to the MR sensor; and

a third gap layer located on top of the MR sensor, the first and second lead layers, and the second gap layer;

wherein a combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion of the shield layer.

18. (Cancelled) A disk drive system, comprising:

a magnetic recording disk;

a magnetoresistive (MR) read head including:

a shield layer,

a bottom gap layer located on top of the shield layer, the bottom gap layer including an upper surface that is planar,

an MR sensor located on top of the bottom gap layer, and

a top gap layer located on top of the bottom gap layer and the MR sensor, wherein a combined thickness of the bottom gap layer and the top gap layer is thinner adjacent to the MR sensor than a location distant therefrom;

an actuator for moving the MR read head across the magnetic recording disk so the MR read head may access different regions of magnetically recorded data on the magnetic recording disk; and

a controller electrically coupled to the MR read head for detecting changes in resistance of the MR read head.

19. (Cancelled) A disk drive system, comprising:

a magnetic recording disk;

a magnetoresistive (MR) read head including:

a shield layer with a recessed portion and a protruding portion defined by the recessed portion,

an MR sensor located in vertical alignment with the protruding portion of the shield layer, and

at least one gap layer situated above and below the MR sensor, wherein at least one of the gap layers is positioned in the recessed portion of the shield layer;

an actuator for moving the MR read head across the magnetic recording disk so the MR read head may access different regions of magnetically recorded data on the magnetic recording disk; and

a controller electrically coupled to the MR read head for detecting changes in resistance of the MR read head.

20. (Added) A method for fabricating a magnetoresistive (MR) read head, the read head comprising:

a shield layer with a recessed portion and a protruding portion defined by the recessed portion, the recessed portion of the shield layer being formed by an etching process;

a first gap layer located on top of the recessed portion of the shield layer, the first gap layer including an upper surface substantially level with an upper surface of the protruding portion of the shield layer;

a second gap layer located on top of the first gap layer and the protruding portion of the shield layer, an upper surface of the second gap layer being planar;

an MR sensor located on top of the second gap layer in vertical alignment with the protruding portion of the shield layer;

first and second lead layers located on top of the second gap layer and connected to the MR sensor; and

a third gap layer located on top of the MR sensor, the first and second lead layers, and the second gap layer;

wherein a combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion of the shield layer.

21. (Added) The method as recited in claim 20, wherein the first gap layer, second gap layer, and third gap layer are constructed from alumina.

22. (Added) The method as recited in claim 20, wherein the first gap layer, second gap layer, and third gap layer are constructed from aluminum oxide.

23. (Added) The method as recited in claim 20, wherein chemical-mechanical polishing is utilized to ensure that the upper surface of the first gap layer is substantially level with the upper surface of the protruding portion of the shield layer.

24. (Added) The method as recited in claim 20, wherein a size of the protruding portion of the shield layer is slightly larger than a size of the MR sensor.

25. (Added) The method as recited in claim 20, wherein the MR sensor is constructed from nickel iron.

26. (Added) The method as recited in claim 20, wherein the first and second lead layers are constructed from copper.

27. (Added) The method as recited in claim 20, wherein the combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion

of the shield layer in order to reduce the chance of a short occurring between the shield layer and the first and second lead layers.

28. (Added) The method as recited in claim 20, wherein the upper surface of the second gap layer is planar to avoid detrimental ramifications of reflective notching.

29. (Added) The method as recited in claim 20, wherein the upper surface of the second gap layer is planar to avoid detrimental ramifications of the swing curve effect.

30. (Added) The method as recited in claim 9, wherein the first gap layer, second gap layer, and third gap layer are constructed from alumina.

31. (Added) The method as recited in claim 9, wherein the first gap layer, second gap layer, and third gap layer are constructed from aluminum oxide.

32. (Added) The method as recited in claim 9, wherein chemical-mechanical polishing is utilized to ensure that an upper surface of the first gap layer is substantially level with an upper surface of the protruding portion of the shield layer.

33. (Added) The method as recited in claim 9, wherein a size of the protruding portion of the shield layer is slightly larger than a size of the MR sensor.

34. (Added) The method as recited in claim 9, wherein the MR sensor is constructed from nickel iron.

35. (Added) The method as recited in claim 9, wherein the first and second lead layers are constructed from copper.

36. (Added) The method as recited in claim 9, wherein a combined thickness of the first gap layer, second gap layer, and third gap layer is thinner adjacent to the MR sensor and the protruding portion of the shield layer than the recessed portion of the shield layer in order to reduce the chance of a short occurring between the shield layer and the first and second lead layers.

37. (Added) The method as recited in claim 9, wherein an upper surface of the second gap layer is planar to avoid detrimental ramifications of reflective notching.

38. (Added) The method as recited in claim 9, wherein an upper surface of the second gap layer is planar to avoid detrimental ramifications of the swing curve effect.